



Figure 2

A cuboid has a rectangular cross-section where the length of the rectangle is equal to twice its width, x cm, as shown in Figure 2.

The volume of the cuboid is 81 cubic centimetres.

- (a) Show that the total length, L cm, of the twelve edges of the cuboid is given by

$$L = 12x + \frac{162}{x^2} \quad (3)$$

- (b) Use calculus to find the minimum value of L .

(6)

- (c) Justify, by further differentiation, that the value of L that you have found is a minimum.

(2)

$y \Rightarrow L = 12x + 4y$	Making expressions into 1
$\frac{d}{dx}$	
AG	Corres
$4x^{-1}$	Either $12x$ or
$x^2 = \frac{324}{12} \Rightarrow x = 3$	Correct differentiation (inc $L' = 0$ and or
54 (cm)	Substitute $x (\neq 0)$
$0 \Rightarrow \text{Minimum}$	Correct ft L'' $\frac{972}{x^3}$ and